Serial No. 09/538,396
Group Art Unit: 1638

REMARKS

Reconsideration of the present application is respectfully requested. Claims 2-8, and 12, and 14-39 are pending. Claim 13 has been cancelled without prejudice or disclaimer. New claims 16-39 have been added. No new matter has been introduced by the addition of these claims. Claims 2, 3, 4, 8, 12, 14 and 15 have been amended. Support for these claims is found in the claims as originally filed, and throughout the specification. No new matter has been added.

Claims 2-4, and 15 have been amended for clarity and to correct antecedent basis.

Claim 8 has been amended to make explicit what was implicit to the original claim and now recites that the transgenic seed "comprising the recombinant expression cassette".

Claims 12 and 14 have been amended to recite the functional activity that the claimed polynucleotides "encode a polypeptide having ATP-dependent DNA binding activity". Support for this amendment is found on page 1, lines 17-20 of the specification.

Claim 14 has been further amended to claim polynucleotides which "selectively hybridize to the full-length complement of SEQ ID NO: 1" under explicitly recited stringent hybridization conditions. New claims 31-38 claim recombinant expression cassettes, cells, plants, and seeds comprising the claimed polynucleotides of claim 14. Support for these amendment and claims is found on page 13, lines 3-9, page 13, line 30 – page 15, line 16, especially page 14, lines 17-19, page 26, lines 12-32, page 30, lines 5-13, and claims 2-8 as filed.

New claims 16-19 require 85%, 90%, 95% and 100% identity to the polynucleotides of claim 12 respectively. Support for this amendment is found in the claims as originally filed and on page 27, lines 3-11 of the specification.

New claim 20 claims "an isolated polynucleotide which encodes a polypeptide having at least 90% sequence identity to SEQ ID NO: 2" and further has the activity recited in claims 12 and 14. N w claims 21 and 22 require 95% and 100%

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sequence identity to the polypeptides encoded by the polynucleotides of claim 20 respectively. New claims 23-30 claim recombinant expression cassettes, cells, plants, and seeds comprising the claimed polynucleotides of claim 20. Support for these claims is found on page 5, line 20 – page 6, line 25, page 23, line 30 – page 24, line 6, page 43, line 21 – page 44, line 5, and claims 2-8 as filed.

New claim 39 claims a polynucleotide which encodes at least 20 contiguous amino acids of SEQ ID NO: 2. Support for this claim can be throughout the specification, for example see page 43, lines 20-31.

Applicant submits a substitute page 5 from the response of February 14, 2002 as required by the Examiner. This page is the clean copy of the amended Abstract.

The marked up version of these amendments is found on a separate sheet attached to this amendment and titled "**Version with Markings to Show Changes Made.**" It is respectfully requested that the amendments be entered.

Rejections under 35 U.S.C. §101:

Claims 2-8 and 12-15 are rejected under 35 U.S.C. §101 as not having either a credible asserted utility or a well-established utility.

The Examiner asserts that "...neither Applicants' specification nor the prior art teaches or provides guidance for how Rad50 activity can be assayed or tested."

Claim 13 has been cancelled. New claims 16-39 have been added. The rejection will be addressed as it may apply to claims 2-8, 12, and 14-39. Claims 12 and 14 have been amended to recite "wherein the polynucleotide encodes a polypeptide having ATP-dependent DNA binding activity." New claim 20 also recites this function. Support for this function is found on page 1, lines 17-20 of the specification

Contrary to the Examiner's assertion, assays for Rad50 are known in the art. For example, Raymond and Kleckner (*Nucl. Acids Res.* 21(16):3851-3856 1993; R f. A2 in IDS submitted 6/23/00) describe several assays for Rad50 including gels and immunoblots (Fig. 1, pag 3852), and ATP-dependent DNA binding assays

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(Figs. 2 and 3, page 3853), and immunoprecipitation (page 3853, col. 2, 1st paragraph). Further, various immunoassays are discussed in the specification (page 28, line 30 – page 29, line 9), particularly a competitive ELISA, which is particularly useful for measuring protein levels.

As amended, the claims require the utility of encoding a polypeptide having ATP-dependent DNA binding activity, for which assays are known in the art as cited above. Applicants believe the amendment and arguments have over come the rejection and therefore respectfully request the rejection of claims 2-8 and 12-15 under 35 U.S.C. §101 should be withdrawn and not applied to claims 16-39.

Rejections under 35 U.S.C. §112, first paragraph – Utility:

Claims 2-8 and 12-15 are rejected under 35 U.S.C. §112, first paragraph as the claimed invention lacks utility, therefore one of skill in the art would know how to use the invention.

As the Applicants have responded, by amendment and argument, to the utility rejection under 35 U.S.C. §101, it is believed that the utility rejection has been overcome. As amended, the claims require the utility of encoding a polypeptide having ATP-dependent DNA binding activity. Therefore, it is respectfully requested that the concomitant rejection of claims 2-8 and 12-15 under 35 U.S.C. §112, first paragraph based on a lack of utility should be withdrawn and not applied to new claims 16-39.

Rejections under 35 U.S.C. §112, first paragraph – Written Description:

Claim 13 is rejected under 35 U.S.C. §112, first paragraph as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention.

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Claim 13 has been cancelled, thereby obviating the rejection. Therefore, it is respectfully requested that the rejection of claim 13 under 35 U.S.C. § 112, first paragraph be withdrawn.

CONCLUSION

In light of the foregoing remarks and amendments, it is believed that claims 2-8, 12, and 14-39 are in condition for allowance. Withdrawal of the outstanding rejections and allowance of all of the remaining claims is respectfully requested.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

The Applicants have used underlining to denote additions to the original text and square brackets [ ] to denote deletions of the original text.

In the Claims:

Claim 13 has been cancelled.

Claims 2, 3, 4, 8, 12, 14 and 15 have been amended as follows:

2. (Twice Amended) A recombinant expression cassette, comprising [a member] the polynucleotide of claim 12 operably linked to a promoter.

3. (Twice Amended) A host cell comprising [a] the polynucleotide of claim 12.

4. (Twice Amended) A transgenic plant comprising a recombinant expression cassette comprising [a] the polynucleotide of claim 12.

8. (Amended) A transgenic seed from the transgenic plant of claim 4 comprising the recombinant expression cassette.

12. (Amended) An isolated polynucleotide [encoding a polypeptide with Rad50 activity] comprising a polynucleotide selected from the group consisting of:
(a) a [polynucleotide] nucleic acid sequence having at least 80% sequence identity over the entire length of [the reference sequence] SEQ ID NO: 1, as determined by the GAP program under default paramet rs[, to a polynucleotide of SEQ ID NO: 1], wherein said

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sequence encodes a polypeptide having ATP-dependent DNA binding activity; and

(b) [a polynucleotide encoding a polypeptide of SEQ ID NO: 2;

(c) a polynucleotide of SEQ ID NO: 1;

(d)]a [polynucleotide] nucleic acid sequence which is fully complementary to [a polynucleotide] the nucleic acid sequence of (a)[, (b), or (c),].

14. (Amended) [A] An isolated polynucleotide comprising a nucleic acid sequence which selectively hybridizes to the full-length complement of SEQ ID NO: 1, under stringent hybridization conditions and a wash in 0.1X SSC at 60°C, [to a polynucleotide of SEQ ID NO: 1], wherein stringent hybridization conditions comprise 50% formamide, 1M NaCl, and 1% SDS at 37°C, wherein the polynucleotide encodes a polypeptide having ATP-dependent DNA binding activity.

15. (Twice Amended) [A] An isolated polynucleotide comprising at least 30 contiguous nucleotides from [a] the polynucleotide of SEQ ID NO: 1.

Claims 16-39 have been added as follows:

16. The isolated polynucleotide of claim 12, wherein the nucleic acid sequence of (a) has at least 85% sequence identity to SEQ ID NO: 1.

17. The isolated polynucleotide of claim 12, wherein the nucleic acid sequence of (a) has at least 90% sequence identity to SEQ ID NO: 1.

18. The isolated polynucleotide of claim 12, wherein the nucleic acid sequence of (a) has at least 95% sequence identity to SEQ ID NO: 1.

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19. The isolated polynucleotide of claim 12, wherein the polynucleotide is SEQ ID NO: 1.

20. An isolated polynucleotide comprising a member selected from the group consisting of:
(a) a nucleic acid sequence encoding a polypeptide having at least 90% sequence identity over the entire length of SEQ ID NO: 2, as determined by the GAP program under default parameters, wherein the encoded polypeptide has ATP-dependent DNA binding activity; and
(b) a nucleic acid sequence which is fully complementary to the nucleic acid sequence of (a).

21. The isolated polynucleotide of claim 20, wherein the nucleic acid sequence of (a) encodes a polypeptide having at least 95% sequence identity to SEQ ID NO: 2.

22. The isolated polynucleotide of claim 20, wherein the polynucleotide encodes the polypeptide of SEQ ID NO: 2.

23. A recombinant expression cassette comprising the polynucleotide of claim 20 operably linked to a promoter.

24. A non-human host cell comprising the recombinant expression cassette of claim 23.

25. A host cell of claim 24, wherein the host cell is a plant cell.

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26. A transgenic plant comprising the recombinant expression cassette of claim 23.

27. The transgenic plant of claim 26, wherein said plant is a monocot.

28. The transgenic plant of claim 26, wherein said plant is a dicot.

29. The transgenic plant of claim 26, wherein said plant is selected from the group consisting of maize, soybean, safflower, sunflower, sorghum, canola, wheat, alfalfa, cotton, rice, barley, and millet.

30. A transgenic seed from the transgenic plant of claim 26 comprising the recombinant expression cassette.

31. A recombinant expression cassette comprising the polynucleotide of claim 14 operably linked to a promoter.

32. A non-human host cell comprising the recombinant expression cassette of claim 31.

33. A host cell of claim 32, wherein the host cell is a plant cell.

34. A transgenic plant comprising the recombinant expression cassette of claim 31.

35. The transgenic plant of claim 34, wherein said plant is a monocot.

36. The transgenic plant of claim 34, wherein said plant is a dicot.

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37. The transgenic plant of claim 34, wherein said plant is selected from the group consisting of maize, soybean, safflower, sunflower, sorghum, canola, wheat, alfalfa, cotton, rice, barley, and millet.

38. A transgenic seed from the transgenic plant of claim 34 comprising the recombinant expression cassette.

39. An isolated polynucleotide comprising a nucleic acid sequence which encodes at least 20 contiguous amino acids from SEQ ID NO: 2.

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ABSTRACT OF THE DISCLOSURE

The invention provides isolated Rad50 nucleic acids and their encoded proteins. The present invention provides methods and compositions relating to altering Rad50 levels in plants. The invention further provides recombinant expression cassettes, host cells, transgenic plants, and antibody compositions.

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